

<b>Notice of Allowability</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/065,036	ZHU ET AL.	
	Examiner Tiffany A. Fetzner	Art Unit 2859	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS. This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1.  This communication is responsive to June 17<sup>th</sup> 2005 and the telephonic interview of 08/30/2005.
2.  The allowed claim(s) is/are 9-15, 17-26 and 32-39.
3.  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a)  All
  - b)  Some\*
  - c)  None
  1.  Certified copies of the priority documents have been received.
  2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3.  Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4.  A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5.  CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a)  including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1)  hereto or 2)  to Paper No./Mail Date 09/01/2005.
  - (b)  including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6.  DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

#### Attachment(s)

1.  Notice of References Cited (PTO-892)
2.  Notice of Draftsperson's Patent Drawing Review (PTO-948)
3.  Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_
4.  Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5.  Notice of Informal Patent Application (PTO-152)
6.  Interview Summary (PTO-413),  
Paper No./Mail Date 09/01/2005.
7.  Examiner's Amendment/Comment
8.  Examiner's Statement of Reasons for Allowance
9.  Other \_\_\_\_\_.

**Examiner's Amendment**

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.
2. Authorization for this examiner's amendment, and formal entry of the June 17<sup>th</sup> 2005 terminal disclaimer was given in a telephone interview with **Attorney Jean K. Testa Reg. No. 39,396** on August 30<sup>th</sup> 2005 along with authorization to charge any necessary fees to applicant's **deposit account: 07-0868**.
3. The application has been amended as follows:

A) **Cancel withdrawn claims 1-6 of the June 17<sup>th</sup> 2005 amendment and response.**

B) **Cancel withdrawn claim 8 of the June 17<sup>th</sup> 2005 amendment and response.**

C) **Replace claim 9 of the June 17<sup>th</sup> 2005 amendment and response with the following Examiner amended claim 9:**

**Claim 9** --- A method of producing an image from an extended volume of interest within a subject using a Magnetic Resonance Imaging (MRI) system, the method comprising:

translating the **extended volume of interest along an axis of the MRI system** using a positioning device and imaging portions of the **extended volume of interest** when they are within the imaging portion of **an imaging magnet within the MRI system**, wherein the extended volume of interest is larger than an imaging portion of **the imaging magnet**;

detecting a plurality of MR signals from at least one radiofrequency (RF) coil array for a given field-of-view within the MRI system as the positioning device is translating the volume;

sending the plurality of MR signals to a plurality of receivers, the receivers each being configured to adjust a receiver parameter; wherein the receiver parameter is adjusted based on direction of the image parallel to a motion of the subject;

computing a plurality of respective sub-images corresponding to the plurality MR signals for each of the plurality of receivers and for the given field-of-view (FOV) at a plurality of incremented locations of the subject;

**extracting a central portion from each of the respective sub-images; and**

**combining only the extracted central portion of each of the respective sub-images in order to form a composite image of the extended volume of interest. ---**

D) Replace claim 18 of the June 17<sup>th</sup> 2005 amendment and response with the following **Examiner amended claim 18:**

**Claim 18** --- A method for imaging an extended volume of interest within a subject using a Magnetic Resonance Imaging (MRI) system comprising:

translating the subject into an imaging portion of a magnet assembly of the MRI system;

detecting a plurality of MR signals from a radiofrequency (RF) coil array;

sending the plurality of MR signals to a plurality of receivers, the receivers each being configured to adjust a receiver parameter, wherein the receiver parameter is adjusted based on direction of the image parallel to a motion of the subject;

reconstructing at least one image of the **extended** volume of interest by computing a plurality of respective sub-images corresponding to the plurality MR signals for each of the plurality of receivers and for the given field-of-view (FOV) at a plurality of incremented locations of the subject as the subject is translated;

**extracting a central portion from each of the respective sub-images; and combining only the central portion of each of the plurality of the respective sub-images in order to form a composite image of the extended volume of interest. ---**

**E) Replace (withdrawn) claim 26 of the June 17<sup>th</sup> 2005 amendment and response with the following Examiner amended pending claim 26:**

**Claim 26** ---The method of **claim 18** wherein the translating step is substantially continuous. ---

**F) Cancel (withdrawn) claims 27-31 of the June 17<sup>th</sup> 2005 amendment and response. ---**

The following is an Examiner's Statement of Reasons for Allowance:

4. With respect to **examiner amended independent claims 9 and 18** each of these independent examiner amended claims is considered to be allowable over the **prior art of record** because, the prior art of record (**Hajnal** US patent 6,385,478 issued May 7<sup>th</sup> 2002, filed December 21<sup>st</sup> 1999; and **Pelc et al.**, US patent 6,445,181 B1 issued September 3rd 2002, filed November 9th 2000), do not show the entire combination of method steps of producing/for imaging an extended volume of interest within a subject using a Magnetic Resonance Imaging (MRI) system comprising every one of the features as set forth in the claims including the limitation of "extracting a central portion from each of the respective sub-images; and combining only the central portion of each of the plurality of the respective sub-images in order to form a composite image of the extended volume of interest, in combination with the remaining limitations of each of the claims. It is the combination of the claim limitations taken as a whole that constitutes both the novelty and non-obviousness of applicant's claims.

5. Hajnal US patent 6,385,478 issued May 7<sup>th</sup> 2002, filed December 21<sup>st</sup> 1999; fails to meet all of the method steps specified by applicant in the examiner amended independent claims, set forth above, because the steps of "extracting a central portion from each of the respective sub-images; and combining only the central portion of each of the plurality of the respective sub-images in order to form a composite image of the extended volume of interest" are not taught suggested or shown by Hajnal and these limitations are also not taught, suggested or shown by combining the plural receiver array of Pelc et al., US patent 6,445,181 B1 issued September 3rd 2002, filed November 9th 2000, with the teachings of Hajnal.

6. It would not have been obvious to one of ordinary skill in the art at the time that the invention was made to include the extraction limitations in either reference, because these references use both central and edge data in forming a composite image, so using only the central portion of each sub-image would teach away from these applied references.

7. **Dependent claims 10-15, 17, 19-26, and 32-39** are considered to be allowable over the **prior art of record** because they each depend from an **allowable examiner amended independent claim**.

8. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

#### Examiner's Comment

#### Terminal Disclaimer of June 17<sup>th</sup> 2005 Approved.

9. The examiner notes that the Terminal Disclaimer of June 17<sup>th</sup> 2005 which terminally disclaims Dumoulin et al., U. S. Patent No. 6,584,337 B2 issued June 24<sup>th</sup> 2003 filed November 21<sup>st</sup> 2001; which corresponds to Dumoulin et al., US patent application publication 2003/0100825 A1 published May 29<sup>th</sup> 2003, filed November 21<sup>st</sup> 2001.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

#### **Drawings**

11. A New complete set of corrected drawings, (i.e. of figures 1 through 4 which are original replacement drawings not unacceptable faxes), are required in this application because the official draftsperson has objected to the drawings submitted **on December 21<sup>st</sup> 2004**

12. A **complete set of NEW FORMAL DRAWINGS** including any and all examiner approved drawing changes, that have occurred during this examination are now required. [See the attached PTO 948 forms concerning the submission of the formal drawings **on December 21<sup>st</sup> 2004, and June 17<sup>th</sup> 2005** of the Official Draftsperson's Reviews, which are attached to this office action.]

13. Applicant is advised to employ the services of a competent patent draftsperson outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

#### **INFORMATION ON HOW TO EFFECT DRAWING CHANGES**

#### **Replacement Drawing Sheets**

Drawing changes must be made by presenting replacement figures which incorporate the desired changes and which comply with 37 CFR 1.84. An explanation of the changes made must be presented either in the drawing amendments, or remarks, section of the amendment. Any replacement drawing sheet must be identified in the top

margin as "Replacement Sheet" (37 CFR 1.121(d)) and include all of the figures appearing on the immediate prior version of the sheet, even though only one figure may be amended. The figure or figure number of the amended drawing(s) must not be labeled as "amended." If the changes to the drawing figure(s) are not accepted by the examiner, applicant will be notified of any required corrective action in the next Office action. No further drawing submission will be required, unless applicant is notified.

Identifying indicia, if provided, should include the title of the invention, inventor's name, and application number, or docket number (if any) if an application number has not been assigned to the application. If this information is provided, it must be placed on the front of each sheet and centered within the top margin.

### **Annotated Drawing Sheets**

A marked-up copy of any amended drawing figure, including annotations indicating the changes made, may be submitted or required by the examiner. The annotated drawing sheets must be clearly labeled as "Annotated Marked-up Drawings" and accompany the replacement sheets.

### **Timing of Corrections**

Applicant is required to submit acceptable corrected drawings within the time period set in the Office action. See 37 CFR 1.85(a). Failure to take corrective action within the set period will result in ABANDONMENT of the application.

If corrected drawings are required in a Notice of Allowability (PTOL-37), the new drawings MUST be filed within the THREE MONTH shortened statutory period set for reply in the "Notice of Allowability." Extensions of time may NOT be obtained under the provisions of 37 CFR 1.136 for filing the corrected drawings after the mailing of a Notice of Allowability.

***Election/Restriction***

14. As per the June 17<sup>th</sup> 2005 amendment and response **Claims 9-15, 17-26 and 32-39**, have been elected by applicant, while **claims 1-6, 8 and claims 27-31**, have been **withdrawn and summarily canceled** by the examiner's amendment above, in order to resolve all remaining issues and place the application in condition for allowance.

***Canceled claims***

15. The examiner notes that originally dependent **claims 7, and 16**, were added into the independent claims by the December 10<sup>th</sup> 2003 amendment, and that **original dependent claims of 7 and 16 have been cancelled**, as per applicant's December 10<sup>th</sup> 2003 amendment and response.

***Response to Arguments***

16. Applicant's arguments filed **June 17<sup>th</sup> 2005** have been fully considered but they are not persuasive. Applicant's arguments, see remarks pages 8 last paragraph through page 10 of the **June 17<sup>th</sup> 2005** amendment and response, with respect to the rejection(s) of **claims 9-15, 17-26 and 32-39** under **35 USC § 103 (a)** as being unpatentable over **Hajnal** US patent 6,385,478 issued May 7<sup>th</sup> 2002, filed December 21<sup>st</sup> 1999; in view of **Pelc et al.**, US patent 6,445,181 B1 issued September 3rd 2002, filed November 9th 2000, have been fully considered and are **not persuasive**, because these reference do teach the features required by the claims of the **June 17<sup>th</sup> 2005** response which applicant alleges to be missing from these references.

17. Specifically, the examiner notes that contrary to applicant's arguments on page 8 last paragraph through page 9 paragraph 2, of the **June 17<sup>th</sup> 2005** response, **Hajnal** does teach the feature of "*an extended volume of interest where the extended volume of interest is larger than an imaging portion of a magnet*", because **Hajnal** teaches with respect to figures 6a, 6b, and figure 8; col. 2 lines 29-32 and col. 6 lines 6-43 where an extended volume is imaged, which is larger than the imaging magnet in three-dimensions. As to the argument that there is no motivation to combine **Hajnal** with **Pelc et al.**, in the examiners last office action. The examiner directs applicant to paragraph 33 on pages 11 and 12 of the last office action.

18. The examiner's amendments to **claims 9 and 18** above are considered to be free of new matter by the examiner because the amended limitations are fully supported by applicant's original disclosure.

19. It is the extraction of the central image data from each sub-image and the subsequent utilization of only the extracted central data in forming the composite extended volume image that distinguishes applicant's claims over the prior arts of **Hajnal** in combination with the **Pelc et al.**, reference.

#### **Double Patenting**

20. The Double-Patenting concerns with **Dumoulin et al.**, US patent application publication 2003/0100825 A1 published May 29<sup>th</sup> 2003, filed November 21<sup>st</sup> 2001; and its corresponding **Dumoulin et al.**, US patent 6,584,337 B2 issued June 24<sup>th</sup> 2003, filed November 21<sup>st</sup> 2001, for which applicant has filed a timely and proper terminal disclaimer; **are rescinded**.

21. The filing of the terminal disclaimer of June 17<sup>th</sup> 2005 has overcome these rejections.

#### **Prior art of Record**

22. The **prior art made of record** and not relied upon is considered pertinent to applicant's disclosure.

- A) **Meaney et al.**, US patent 5,924,987 issued July 20<sup>th</sup> 1999 which teaches obtaining data from the center of k-space for multiple fields-of-view and concatenating in a mosaic fashion the central k-space data to make an overall image.
- B) **Wang et al.**, US patent 5,928, 148 issued July 27<sup>th</sup> 1999.
- C) **Machida** US patent application publication 2002/0115929 A1 published August 22<sup>nd</sup> 2002; with an effective filing date of September 21<sup>st</sup> 2001;
- D) **Kruger et al.**, US patent application publication 2002/0173715 A1 published November 21<sup>st</sup> 2002, filed November 26<sup>th</sup> 2001, which teaches a method for acquiring MRI data from a large field-of-view using continuous table motion.
- E) **Brittain et al.**, US patent application publication 2003/0011369 A1 published January 16<sup>th</sup> 2003, filed September 4<sup>th</sup> 2002, which teaches a method for acquiring MRI

data from a large field-of-view using continuous table motion, and is a **continuation-in-part of Brittain 2002/0173715 A1** applied above.

F) **Brittain** US patent application publication 2004/0155654 A1 published August 12<sup>th</sup> 2004, filed December 30<sup>th</sup> 2003, which teaches a method for acquiring MRI data from a large field-of-view using continuous table motion, and is a **continuation of Brittain 2002/0173715 A1** applied above.

G) **Demoulin et al.**, US patent application publication 2003/0100825 A1 published May 29<sup>th</sup> 2003, filed November 21<sup>st</sup> 2001, which teaches a method and system for extended volume imaging using MRI. The examiner notes that this reference is noted for the purposes of a complete record, but does not constitute prior art against the claims of the instant application because it is applicant's own earlier work, and was filed less than a year before the filing of applicant's instant application.

H) **Demoulin et al.**, US patent 6,584,337 B2 issued June 24<sup>th</sup> 2003, filed November 21<sup>st</sup> 2001, for which applicant has filed a timely and proper terminal disclaimer. [See the **terminal Disclaimer filed June 17<sup>th</sup> 2005 from the June 17<sup>th</sup> 2005 response**, as listed on page 8 paragraph 2, in the **Remarks of the June 17<sup>th</sup> 2005 response**.] which corresponds to **Demoulin et al.**, pre-Grant publication 2003/0100825 A1 and teaches a method and system for extended volume imaging while extracting center portion data using MRI, has been overcome by the filing of a proper terminal disclaimer. The examiner notes that this reference is noted for the purposes of a complete record, but does not constitute prior art against the claims of the instant application because it is applicant's own earlier work, and was filed less than a year before the filing of applicant's instant application.

I) **Zhu et al.**, US patent application publication 2004/0051529 A1 published March 18<sup>th</sup> 2004, filed September 12<sup>th</sup> 2002, which is the publication of applicant's instant application as originally filed. The examiner notes that this reference is noted for the purposes of a complete record, but does not constitute prior art against the claims of the instant application because it is applicant's own work.

J) **Brittain** US patent application publication 2002/0140423 A1 published October 3<sup>rd</sup> 2002; with an effective filing date of October 5<sup>th</sup> 2001. [Note this reference has been

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**disqualified as prior art based upon the 103( c ) prior art exception because this reference is assigned to the same assignee as the assignee of the instant application.]**

K) **Kuhara** US patent application publication 2002/0021128 A1 published February 21<sup>st</sup> 2002, filed April 25<sup>th</sup> 2001.

L) **Hajnal** US patent 6,385,478 issued May 7<sup>th</sup> 2002, filed December 21<sup>st</sup> 1999. This reference fails to teach the features of "extracting a central portion from each of the respective sub-images; and combining only the extracted central portion of each of the respective sub-images in order to form a composite image of the extended volume of interest". In the **Hajnal** reference each sub-image slice (i.e. A, B, C, D, of figure 8) contains and combines both central imaging data, and edge imaging data in the formation of the image showing the extended volume of interest.

M) **Pelc et al.**, US patent 6,445,181 B1 issued September 3rd 2002, filed November 9th 2000. This reference also fails to teach the features of "extracting a central portion from each of the respective sub-images; and combining only the extracted central portion of each of the respective sub-images in order to form a composite image of the extended volume of interest".

### Conclusion

23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tiffany Fetzner whose telephone number is: (571) 272-2241. The examiner can normally be reached on Monday-Thursday from 7:00am to 4:30pm., and on alternate Friday's from 7:00am to 3:30pm.

24. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez, can be reached at (571) 272-2245. The **only official fax phone number** for the organization where this application or proceeding is assigned is **(571) 273-8300**.

  
TAF  
September 1, 2005

  
9.2.05  
Diego Gutierrez  
Supervisory Patent Examiner  
Technology Center 2800